

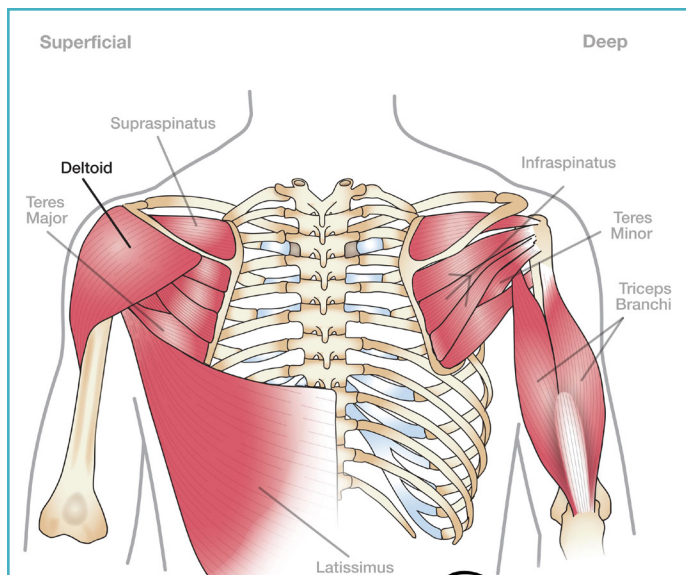
Rock climbing has an increased following in the last several decades. Many people pursue rock-climbing as a serious hobby. Other people climb once in a while as a weekend activity. With the right training and gear, rock climbing is generally a safe activity. However, there are specific injuries common among rock climbers that can occur.

## Causes

The most feared risk of trauma while climbing would be a single fall event. The difficult task of repeatedly scaling a wall can also result in overuse injuries. Overuse injuries can affect any joint in the body. The amount of work done by the upper extremities during climbing makes them prone to injury. These injuries can affect multiple joints in the upper extremity, which are discussed below.

## Shoulder Injuries

Rock climbers spend a lot of time with their arms over their head pulling up their body weight. This puts them at risk for rotator cuff injury. The rotator cuff is the group of four muscles and tendons that surround the shoulder joint. The rotator cuff provides strength and stability (Figure 1). Rotator cuff injuries can include tendinitis (irritation of the tendon), wear and tear of the tendon (degeneration), or a partial or complete tear.



### Shoulder Injury Signs and Symptoms

- Pain
- Decreased motion
- Weakness when lifting or lowering the arm
- Clicking
- Popping
- Catching
- Locking
- Feeling like the shoulder isn't stable

### Shoulder Injury Diagnosis

Diagnosis of a rotator cuff injury will begin with a history and physical examination by a doctor. X-rays do not directly show the rotator cuff muscles. X-rays are often obtained to look for bone problems that might suggest a rotator cuff tear and look for other causes of pain or weakness. If your doctor is suspicious of a rotator cuff tear, he or she may order an MRI.

### Shoulder Injury Treatment

Treatment of rotator cuff injury depends on the type and severity of the injury.

- Tendinitis and small tears: conservative treatment begins with rest, ice, and anti-inflammatory oral medications. Physical therapy is also often very helpful. If these measures fail, corticosteroid injections are often considered.
- Large tear or degeneration: Surgery may be necessary to repair or reinforce the tendon. Tears which cannot be repaired may require tendon transfers or joint replacement surgery.

## Elbow Injuries

Lateral epicondylitis is often referred to as tennis elbow. It is not just for tennis players though! This irritation of the tendons on the outside part of the elbow is caused by repetitive movements. Because climbers repeatedly grip holds to keep themselves on the wall, they can develop irritation of those tendons.

### Elbow Injury Signs and Symptoms

Pain is the most common symptom of lateral epicondylitis. This pain is located on the outside of the elbow over the bone. This pain is often worse by touching the area. The pain is also worse with rock-climbing. It is worse with any activities that require a lot of gripping or lifting. Occasionally, any motion of the elbow can be painful.

### Elbow Injury Diagnosis

The diagnosis of lateral epicondylitis is usually made by a history and physical examination. X-rays may be obtained to rule out other causes of elbow pain.

### Elbow Injury Treatment

Lateral epicondylitis will almost always be treated without surgery. Non-surgical treatments usually include:

- Activity modification: First try to limit the activity that caused the condition. Decreasing or avoiding rock climbing for a short time may improve the pain. If the activity cannot be stopped altogether, a physical therapist may be able to teach you how to modify your grip or technique to relieve the pain.

- Medications: Anti-inflammatory medications may help alleviate pain
- Brace: A band worn over the muscle just below the elbow can improve symptoms in some patients.
- Steroid injection: Your doctor may recommend injection of a stronger anti-inflammatory medication at the elbow.

### Wrist Injuries

Rock climbing requires a lot of joint stability. Too much rock climbing can cause damage to the structures that stabilize and support your wrist. The most common wrist injury in climbers is damage to the triangular fibrocartilage complex (TFCC). The TFCC is made of tough connective tissue and cartilage. It connects the two forearm bones to one another. The TFCC also connects the forearm to the small bones on the pinky side of the wrist. The TFCC acts as a cushion and stabilizer in the wrist. This function is important for gripping or rotating motions. Because climbers do these motions frequently, the TFCC can become irritated, degenerate, or even tear.

#### *Wrist Injury Signs and Symptoms*

- Pain
- Clicking or popping while turning the forearm or moving the wrist side-to-side
- Weakness
- Limited motion
- Feeling like the wrist isn't stable

#### *Wrist Injury Diagnosis*

Diagnosis of a TFCC injury will begin with a history and physical examination. X-rays do not show the TFCC but are often obtained to check for other causes of wrist pain. If your doctor is suspicious of a TFCC tear, he or she may order an MRI. Another option is to do a surgery called arthroscopy. Arthroscopy uses a small camera to look inside the wrist joint for a tear in the TFCC.

#### *Wrist Injury Treatment*

Treatment of a TFCC injury depends on the type and severity of the injury. Many patients improve with splinting, activity changes, anti-inflammatory medications, or injection of steroid (strong anti-inflammatory medication), also known as a cortisone shot. If these do not help, surgery may be required to repair the injury.

### Finger Injuries

Rock climbing requires significant grip strength to hold a climber's body close to the wall or pull the climber up. There is a lot of anatomy responsible for a climber's strong grip to the wall! Tendons are the thick, rope-like structures that connect muscles to bones. These tendons are held close to the bones by a system of pulleys. Pulleys

keep the tendons in the right position while joints and bones are changing their angle during movement and grip. Ligaments hold the bones in alignment with one another. These structures contribute to the delicate balance of forces that allows a climber to fight gravity.

Common climbing injuries to the fingers are discussed below.

### Flexor Tendon Tear

There are two tendons that flex each finger. One is called the flexor digitorum superficialis (FDS). The other is called the flexor digitorum profundus (FDP). These tendons are put under a lot of tension during climbing and can stretch or tear.

Some signs and symptoms of a flexor tendon tear are:

- Pain in finger, palm, or wrist
- Tenderness
- Inability to bend one or more joints in the finger

Diagnosis of a flexor tendon injury will begin with a history and physical examination by a doctor. X-rays do not show the flexor tendons. X-rays are often obtained to look for fractures that might be associated with the tendon injury. If your doctor is suspicious of a flexor tendon injury, he or she may order an ultrasound or MRI to confirm if there is a tear in the tendon. They may also show where the tendon is torn.

If you think you might have a flexor tendon injury, please see a hand surgeon right away. It is often much easier to treat these injuries soon after injury. Partial injuries can be treated with splinting, rest, and hand therapy. Complete flexor tendon tears do not heal by themselves. Surgery is required to repair the tendon and restore motion. Without surgery the tendon will not function. After surgery, a splint and hand therapy will be required to protect the repair and aid in recovery.

### Trigger Finger

Trigger finger is a common condition that can develop in climbers. The flexor tendon can get irritated due to overuse in climbing. This causes thickening and nodules of the tendon that can prevent the tendon from gliding. This can make it difficult to bend or straighten the joints of the finger. Please refer to our the trigger finger page for discussion of symptoms, diagnosis, and treatment of this condition.

### A2 Pulley Strain

The A2 pulley is the structure that holds the flexor tendon close to the first finger segment (proximal phalanx). A2

pulley injury is the most common injury for climbers. This often happens when a climber slips and their grip tightens to catch themselves. The A2 pulley can be partially or completely torn. This causes the tendon to pull away from the bone. The tendon is not as effective in this position. Climbers often report they feel their grip is weak after this type of injury. They may also report finger pain.

Signs and symptoms of an A2 pulley strain are:

- “Pop” sound at time of injury
- Pain
- Bruising
- Swelling
- Difficulty forming a fist
- Weak grip

Diagnosis of a pulley injury will begin with a history and physical examination. X-rays do not show the injured pulley, but are often obtained to check for other causes of finger pain or associated fractures. If your doctor is suspicious of an A2 pulley injury, he or she may order an ultrasound or MRI.

Treatment of A2 pulley strain depends on the type and severity of the injury. A strain describes a stretch or partial tear of the pulley. These are treated with rest, ice, splinting, and physical therapy. After the pulley heals, many climbers will use tape. They may also use a specialized ring on the injured finger. Tape or rings support the pulley while climbing.

On the other hand, a rupture describes a complete tear of the pulley. Many of these injuries will be treated successfully with the same conservative measures as a strain. Sometimes symptoms do not improve with these treat-

ments. If this occurs, surgery may be required to reconstruct the pulley.

### **Collateral Ligament Strain**

The collateral ligaments surround each finger joint. These strong, thick structures hold the finger bones to one another and prevent unwanted movement. Collateral ligament strains usually occur when a climber suddenly moves their weight sideways, like when you swing to put both hands on the same hold.

Some signs and symptoms of a collateral ligament strain include:

- Pain
- Swelling
- Tenderness
- Difficulty moving the joint

Diagnosis of a collateral ligament strain is usually made by history and physical examination. X-rays do not show this injury, but are often obtained to look for fractures that might be associated with the injury.

Fortunately, treatment for collateral ligament strain does not usually require surgery. Most patients are treated with rest, ice, anti-inflammatory medications, and taping or splinting the finger for support. In rare cases an acute or chronic collateral ligament strain requires surgery. This is most common for a thumb ulnar collateral ligament tear at the metacarpophalangeal joint. This is called a gamekeeper’s or skier’s thumb. It is also common for the index finger at the radial collateral ligament of both the metacarpophalangeal and proximal interphalangeal joints. These thumb and index finger joints are critical for pinch stability.